Dakota.—Webster, 10th, 11th, 25th, 29th, 30th.
Florida.—Key West, 1st; Limona, 2d, 17th, 18th, 19th, 23d; Archer, 10th, 18th, 22d, 27th, 28th; Alva, 10th, 19th, 20th, 21st.
Illinois.—Charleston, 19th, 22d, 25th, 28th; Windsor, 27th.
Indiana.—Vevay, 25th, 26th.
Iowa.—Davenport, 6th, 8th, 9th, 15th, 24th, 26th.
Kansas.—Allison, 3d to 31st; Topeka and Wilmington, 10th.
Maryland.—Fallston, 20th; Fort McHenry, 21st; Woodstock, 23d; Baltimore, 26th.
Massachusetts.—Cottage City, 11th; Somerset, 23d.
Michigan.—Mackinaw City, 1st; Kalamazoo, 2d, 7th, 11th, 25th, 27th, 28th, 30th.
New Hampshire.—Nashua, 10th.
New Jersey.—Egg Harbor City, 2d, 3d; Clayton, 3d, 23d; Beverly, 9th, 10th; Dover, 20th, 28th, 29th; Upper Montclair, 30th.
New York.—North Volney, 3d; Mountainville, 3d, 4th, 17th, 23d; Albany, 10th.
Ohio.—Napoleon, 10th; Jacksonborough, 28th.
Oregon.—Mount Angel, 10th.
Pennsylvania.—Pittsburg, 21st; Dyberry, 26th.
South Carolina.—Stateburg, 3d; Spartanburg, 28th; Aiken, 30th.
Texas.—Cleburne, 7th, 10th, 16th, 17th, 18th, 21st to 24th, 28th.
Vermont.—Strafford, 4th.
Virginia.—Chincoteague, 2d, 13th; Variety Mills, 2d; Dale Enterprise, 26th; Rappahannock, Station, 9th, 12th, 16th, 18th.

POLAR BANDS.

Polar bands were reported during the month from the following stations:
Archer, Florida, 1st, 2d, 6th, 31st.
Riley, Illinois, 15th, 21st.
Salina, Kansas, 19th, 22d, 24th.
Beverly, New Jersey, 4th.
Napoleon, Ohio, 8th.
Wauseon, Ohio, 18th.
Wytheville, Virginia, 2d, 3d, 13th.
Prairie du Chien, Wisconsin, 17th.

SAND STORMS.

Fort McDowell, Arizona, 10th, 13th, 22d, 24th.
Yuma, Arizona, 25th.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for August, 1886:

Date—August, 1886. Standard time.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 3 p. m.	1	3	0	0	1	3	4	50‡	
2, 4 p. m.	0	4	2	5‡	.....	.....	3	45‡	
6, 9 a. m.	.....	.....	.....	.....	.....	.....	2	35‡	
8, 2 p. m.	.....	.....	.....	.....	.....	.....	1	5	
9, 5 p. m.	0	0	0	0	0	0	1	5	
10, 7 p. m.	0	0	0	0	0	0	1	4	
11, 4 p. m.	1	4	0	3	1	4	2	5	
12, 3 p. m.	0	0	1	1	0	0	1	4	
14, 10 a. m.	0	0	0	0	0	0	1	4	
15, 5 p. m.	0	0	0	0	0	0	1	3	
17, 9 a. m.	0	0	0	0	0	0	1	3	
18, 5 p. m.	1	3	0	0	0	0	2	6	
20, 4 p. m.	1	1	.....	.....	0	0	2	2	
21, 6 p. m.	1	1	0	0	1	1	1	1	Small spot.
22, 3 p. m.	1	1	0	0	1	1	1	1	Small spot.
23, 7 a. m.	0	0	0	0	0	0	1	1	Small spot.
24, 12 m.	0	2	0	0	0	0	1	3	Small spots.
26, 11 a. m.	0	10‡	0	0	0	0	1	13‡	
27, 4 p. m.	0	12‡	0	0	0	0	1	25‡	
28, 5 p. m.	0	5‡	0	0	0	0	1	30‡	
29, 6 a. m.	0	0	0	0	0	0	1	15‡	
29, 3 p. m.	0	0	0	0	0	0	1	10‡	

Faculæ were seen at the time of every observation. ‡Approximated.

Mr. H. D. Gowey, of North Lewisburg, Champaign county, Ohio, reports having observed sun spots on the following dates: 1st to 4th, 6th, 7th, 9th, 10th, 11th, 13th, 18th, 19th, 26th, 27th, 31st.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty stations show 4,948 observations to have been made, of which five were reported doubtful; of the remainder, 4,943, there were 4,298, or 87.0 per cent., followed by the expected weather.

RED SUNSETS.

The following description of red sunsets is furnished by Prof. Cleveland Abbe, Assistant:

Red sunsets have been frequently looked for by me during July and August, 1886, but the following is the only case that has been noted:

August 21, 1886, on board steamer "G. W. Leary," steaming northward in middle of lower Chesapeake Bay, latitude N. 37° 10′, longitude W. 0° 50′ from Washington City, sunset clouds a few degrees high (watch about three minutes fast on Eastern time, and this correction applied to my record); 7 h. 0 m., suspected pink; 7 h. 3 m., decided pink glow, maximum altitude 15°; 7 h. 7 m., very rich yellow, and brightness generally increased, but pink rapidly fading; 7 h. 12 m., no pink visible, but pale salmon tint up to 8° altitude. August 22d, 23d, and 24th, in Washington City, suspected pink for a few minutes but no decided tint.

WATER-SPOUTS.

Pensacola, Florida: a water-spout was visible from the city at 6.30 a. m. of the 17th, near Santa Rosa Island in the Gulf. It resembled a solid column of dense black cloud, extending from the sky to the water. At one time the spout attained the diameter of forty feet. The phenomenon lasted about half an hour, during which time it assumed various forms.

The schooner "Nelson Bartlett," Capt. S. Watts, commanding, on the 22d, at 12 noon (Greenwich mean time), in N. 8° 02′, W. 47° 17′, passed two water-spouts; wind south, weather clear.

Capt. Samuel Adamson, commanding the s. s. "Joshua Nicholson," reports having observed on August 28th, at 6 p. m. (Greenwich mean time), an immense water-spout off the north end of Fayal, Azores, which seemed to touch the north end of the island; it was accompanied with moderate squalls and torrents of rain, and was distant fifteen miles sse. of the vessel. The brig "Lilian," Capt. H. F. Schive, commanding, passed a heavy water-spout on the 5th, in N. 12° 50′, W. 57° 30′; wind strong from se., with rain.

VERIFICATIONS.

INDICATIONS.

The indications for August, 1886, were made by 2d Lieutenant J. E. Maxfield, Signal Corps, U. S. Army, Assistant. The indications for the first twenty-five days of August, 1886, were verified by 2d Lieutenant Frank Greene, Signal Corps, U. S. Army, Assistant; the remaining six days, by 2d Lieutenant J. P. Finley, Signal Corps, U. S. Army, Assistant.

The detailed comparison of the tri-daily indications for August, 1886, with the telegraphic reports for the succeeding thirty-two hours, shows the general average percentage of verifications to be 75.36. The percentages for the different elements are: Weather, 74.22; wind, 70.78; temperature, 77.92. By states, etc., the percentages are: For Maine, 71.45; New Hampshire, 71.80; Vermont, 70.48; Massachusetts, 71.45; Rhode Island, 77.07; Connecticut, 75.59; New York, 77.31; Pennsylvania, 79.96; New Jersey, 81.16; Delaware, 75.54; Maryland, 79.28; District of Columbia, 78.63; Virginia, 75.73; North Carolina, 75.72; South Carolina, 73.31; Georgia, 73.65; Florida, 73.82; Alabama, 75.24; Mississippi, 72.88; Louisiana, 78.41; Texas, 86.48; Arkansas, 73.63; Tennessee, 66.88; Kentucky, 71.21; Ohio, 80.11; West Virginia, 79.01; Indiana, 75.70; Illinois, 77.33; Michigan, 82.04; Wisconsin, 74.48; Minnesota, 72.99; Iowa, 71.51; Kansas, 76.22; Nebraska, 69.49; Missouri, 76.18; Colorado, 62.34; east Dakota, 66.29.

There were three omissions to predict, out of 9,951, or 0.03 per cent. Of the 9,948 predictions that have been made, six hundred and sixty-three, or 6.66 per cent., are considered to have entirely failed; six hundred and two, or 6.05 per cent., were one-fourth verified; 1,858, or 18.68 per cent., were one-

half verified; 2,049, or 20.60 per cent., were three-fourths verified; 4,776, or 48.01 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During August, 1886, thirty-eight signals of various kinds were ordered, of which number, thirteen, or 34.21 per cent., were fully justified both as to direction and velocity. Of the above signals, seven were ordered for northeasterly winds; of these, four, or 57.14 per cent., were justified both as to direction and velocity, and five, or 71.42 per cent., were justified as to velocity only. Thirty-one signals were ordered for winds without regard to direction; of these, twenty-two, or 70.97 per cent., were not verified, and nine, or 29.03 per cent., were verified.

In twenty-one cases winds occurred which would have justified cautionary signals had they been displayed, and in eleven cases winds occurred which would have justified the display of on-shore signals.

RAILWAY WEATHER SIGNALS.

Prof. P. H. Mell, jr., director of the "Alabama Weather Service," in the report for August, 1886, states:

The verification of predictions for the whole area was 92.7 per cent. for temperature, and 75 per cent. for weather.

The following corporations comprise this system: South and North; Montgomery and Mobile; Mobile and Girard; Georgia Pacific; East Tennessee, Virginia and Georgia system in Alabama; Memphis and Charleston; Columbus and Western; Atlanta and West Point of Georgia; Northeastern of Georgia; Western and Atlantic; East Tennessee, Virginia and Georgia system in Georgia; Montgomery and Eufaula; Pensacola and Selma; Pensacola and Atlantic; the cities of Milledgeville, Georgia, and Talladega, Alabama.

LOCAL WEATHER SIGNALS.

Prof. Goodwin D. Swezey, director of the "Nebraska Weather Service," in the report for August, 1886, makes the percentage of verifications for temperature in the state 85.0, and weather 71.7.

Prof. Winslow Upton, director of the "New England Meteorological Society," in the report for August, 1886, states:

The verification of weather signals at New Haven was 84 per cent. for temperature, 74 for weather; at fourteen other stations reporting to the secretary, 87.1 for temperature, 79.9 for weather. Predictions at Blue Hill for twenty-four hours from sunset were 81 per cent. verified, and for sixteen hours from 8 a. m. 84 per cent. verified. It should be noted that no rules have been adopted for verifying predictions, and these returns are not strictly comparable.

ERRATA.

In the REVIEW for July, 1886, on page 185, under "Precipitation," in the lines "The distribution of rainfall over the United States and Canada for June, 1886," instead of "June" read July. In the same REVIEW on page 190, under "Cotton region reports," in the third line, instead of "June" read July. On page 202, in the "Meteorological record of voluntary observers and Army post surgeons," under Alabama, instead of "Birmingham" read Greensborough.

Meteorological record of voluntary observers and Army post surgeons, August, 1886.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. Maximum.	Minimum.	Mean.	Rainfall.
Alabama.	°	°	°	*Inches*
Greensborough	94	67	79.0	7.31
Mount Vernon B'ks.	102	64	82.2	6.90
Arizona.				
Huachuca, Fort	97	55	75.0	4.24
Lowell, Fort	111	67	86.4	1.24
McDowell, Fort	116	64	92.2	2.04
Arkansas.				
Lead Hill*	109	53	81.0	3.91
British Columbia.				
New Westminster	83	49	64.4	1.60
California.				
Alcatraz Island	69	48	55.5	0.00
Anderson	107	62	80.0	0.00
Angel Island	84	52	62.1	0.00
Benicia Barracks	94	55	69.8	0.00
Bidwell, Fort	96	39	72.5	0.04
Cahuenga				0.16
Gaston, Fort	104	38	70.9	0.00
Hydesville				0.00
Mason, Fort	84	54	62.3	0.00
Nicolaus	101	58	78.2	trace
Oakland	81	54	61.2	0.00
Oroville	98	62	80.2	trace
Poway	98	64	74.2	0.02
Presidio of San F	75	47	58.0	0.00
Princeton	105	50	76.6	trace
Sacramento	99	49	72.2	0.00
Salinas	78	54	59.6	0.00
Santa Barbara	85	53	68.2	trace
Susanville	97	68	72.0	0.03
Colorado.				
Colorado Springs	89	45	68.9	1.39
Lewis, Fort	88	39	64.9	3.99
Connecticut.				
Hartford	88	42	68.3	3.33
North Colebrook	88	35	64.2	1.51
Southington	90	49	67.9	2.35
Dakota.				
Abr. Lincoln, Fort	109	32	70.8	1.90
Meade, Fort	103	32	77.9	1.50
Pembina, Fort	101	34	65.9	0.25
Randall, Fort	101	30	75.7	4.25
Richardton	106	36	69.8	1.40
Sisseton, Fort	100	29	69.7	1.60
Sully, Fort	110	39	77.0	1 15
Totten, Fort	105	33	69.4	0.89
Webster	106	31	71.8	2.36
Yates, Fort	106	27	74.1	3.21
District of Columbia.				
Distributing Res'r*	90	58	75.8	1.58
Receiving Res'v'r*	90	61	75.6	1.07
Rock Creek Bridge*	93	60	77.1	
Florida.				
Alva*	95	70	78.4	9.55
Archer *	97	69	81.9	5.50
Limona *	102	72	83.7	8.91
Manatee	95	75	83.5	11.43
Meade, Fort				10.50
Merritt's Island	92	69	79.9	4.21
St. Augustine, Fort	92	69	79.3	6.70
Tallahassee *	94	70		7.75
Georgia.				
Athens	94	60	76.6	2.78
Forsyth*	98	68	79.7	3.49
Milledgeville	96	62	80.0	5.54
Idaho.				
Boise Barracks	102	50	79.1	trace
Cœur d'Alene, Fort	95	41	67.6	0.04
Illinois.				
Anna*	98	51	77.9	2.63
Bunker Hill				2.94
Bloomington	94	58		1.73
Collinsville	101	51	76.8	3.45
Charleston*	102	50	76.1	2.90
Geneseo*	97	43	75.3	0.83
Mattoon *	102	58	77.0	3.30
Pekin *	99	47	77.4	5.53
Peoria	99	52	78.8	3.30
Riley	93	45	69.6	5.85
Rockford*	90	50	71.0	8.41
Sandwich	96	52	73.7	3.01
South Evanston	96	44		3.58
Sycamore	96	44	70.2	4.29
Windsor	100	48	76.3	3.08
Indian Territory.				
Gibson, Fort	105	52	80.3	3.00
Reno, Fort	108	58	83.2	0.34
Supply, Fort	104	55	79.8	0.92
Indiana.				
Butlerville *	95	55	75.0	6.00
Fort Wayne*	96	47	72.0	4.41
Connersville	87	58	70.8	7.43
Jeffersonville	93	55	75.3	5.16
Laconia	97	53	75.7	3.35
Lafayette	97	44	74.0	4.46
La Grange	90	42	70.5	5.70
Logansport*	98	52	74.4	6.30
Mauzy	88	44	69.2	7.31
Spiceland	91	48	70.6	6.88
Summan*	90	50	73.8	7.38
Terre Haute*	91	60		3.40
Vevay	93	55	74.9	3.18
Iowa.				
Bancroft	98	34	72.8	1.66
Cedar Rapids *	96	40	78.5	1.70
Corydon	102	57	79.0	2.10
Des Moines	100	42	75.5	
Fort Madison	96	55		6.60
Independence *	94	52	73.4	1.12
Logan	100	48	76 8	2.20
Manchester*	98	43	75.1	0.70
Monticello *	99	40	73.5	2.38
Muscatine	100	47	75.4	2.62
Oskaloosa*		58	74.1	1.11
Oskaloosa*	95	47		
Urbano	103	54	75.5	0.53
Kansas.				
Allison	108	49	77.5	1.13
Atchison *	105	54	79.4	1.76
Belleville	101			1.64
Emporia	102	56	78.8	2.49
Hays, Fort	102	48	75.9	2.41
Independence *	104	58	78.4	4.25
Lawrence	105	52	79.0	2.49
Manhattan*	105	60	78.8	2.01
Manhattan*	110	49	78.7	2.06
Riley, Fort	104	54	79.9	1.38
Salina	102	60	80.7	4.00
Sterling	102	58	76.7	4.77
Topeka	107	54	80.5	3.03
Wellington	100	55	78.0	2.96
West Leavenworth	110	53		1.00
Westmoreland*	105	50	79.0	0.75
Wyandotte	108	48	71.0	1.30
Yates Centre	99	49	76.5	3.57
Kentucky.				
Bowling Green	95	60		
Frankfort	92	53	75.4	4.35
Louisiana.				
Grand Coteau	95	72	82.0	1.62
Liberty Hill	94	71	87.5	4.31
Luling*	94	65	79.9	1.09
Maine.				
Bar Harbor	90	47		1.44
Cornish *	90	49	65.8	4.08
Gardiner	87	47	64.7	2.82
Orono*	90	43	65.6	2.27
Maryland.				
Cumberland	88	50	70.5	3.25
Fallston*	89	54	70.9	4.53
Great Falls*	94	55	74.3	1.03
McDonogh	89	54	74.4	0.83
McHenry, Fort	85	58	72.3	3.74
Woodstock	89	50	71.0	2.21
Massachusetts.				
Amherst a	90	39	66.3	2.60
Amherst b	88	50	67.3	2.92
Blue Hill Obs'y	88	50	65.4	3.95
Dudley	92	40	70.2	3.04
Fall River	85	46	66.6	4.18
Fitchburg	90	51	67.4	3.15
Heath	90	50		
Milton	85	43	64.3	3.29
New Bedford	84	48	66.6	2.95
Princeton	90	47	65.1	3.18
Somerset*	92	47	70.4	3.53
Taunton	92	45	67.5	3.81
Westborough	95	38	70.0	4.41
Worcester	83	51	66.1	3.81
Michigan.				
Brady, Fort	92	36	64.5	1.42
Harrisville*	91	34		4.33
Hudson	92	36		4.60
Kalamazoo	86	51	68.5	4.67
Lansing	80	38	68.5	5.70
Mottville	92	50		2.88
Pentwater	93	32	66.2	4.58
Thornville	92	49	69.9	3.25
Traverse City *	95	48		4.20
Minnesota.				
Minneapolis	95	45	70.4	2.33
Snelling, Fort	96	39	72.4	3.13
Missouri.				
Carthage	100	53	79.7	3.82
Centreville	103	43		5.22
Central College*	105	50	79.5	3.06
Conception	100	50	78.1	1.57
Pierce City	100	52	77.3	3.10
Warrenton	101	60	77.8	
Montana.				
Assiniaboine, Fort	97	46	70.2	0.17
Ellis, Fort	102	34	68.2	1.01
Keogh, Fort	112	36	76.0	0.32
Missoula, Fort	90	44	67.2	0.30
Shaw, Fort	95	35	69.1	0.28
Nebraska.				
Brownville	102	53	78.0	2.12
Crete	99	46	75.0	3.24
De Soto *	100	49	75.8	2.71
Fairbury	100			3.49
Fremont*	97	40	74.1	2.77
Genoa	97	43	75.4	3.20
Hay Springs *	98	40	68.9	2.32
Marquette	96			3.73
Niobrara, Fort	105	35	75.8	1 82
Robinson, Fort	103	38	74.3	0.90
Sidney, Fort	101	38	71.5	1.04
Tecumseh	104	50	83.1	1.01
Nevada.				
Carson City	98	39	72.1	0.00
Halleck, Fort	94	40	70.9	0.24
McDermit, Fort	96	49	73.4	2.06
New Hampshire.				
Antrim				2.15
Ashland				3.54
Belmont				2.87
Berlin Mills	90	34	62.5	3.57
Bristol				3.22
Hanover				2.25
Lake Village				3.56
Nashua	95	38	67.5	2.71
Wier's Bridge				3.54
Wolfborough				3.19
Woodstock				3.87
New Jersey.				
Beverly *	92	56	71.6	2.15
Clayton *	96	51	71.8	2.98
Dover *	94	42	67.1	3.38
Egg Harbor City	92	48	70.8	5.36
Moorestown	93	52	70.1	2.44
Phillipsburg				1.81
Rendington *	96	60	74.1	
Roseland				1.79
South Orange	88	54	68.0	1.10
Upper Montclair	88	52	71.0	2.59

Meteorological record of voluntary observers, etc.—Continued.